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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/815,907

03/31/2004

Brian Lee Lawrence

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07/05/2006

GENERAL ELECTRIC COMPANY  
GLOBAL RESEARCH  
PATENT DOCKET RM. BLDG. K1-4A59  
NISKAYUNA, NY 12309

EXAMINER

VAN ROY, TOD THOMAS

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 07/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/815,907

Applicant(s)

LAWRENCE ET AL.

Examiner

Tod T. Van Roy

Art Unit

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– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 May 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6, 8-15 and 23-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-11, 14, 15, 23-25 and 28 is/are rejected.
- 7) ☒ Claim(s) 12-13, 26-27 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Specification***

The abstract, as amended, is accepted.

### ***Response to Amendment***

The examiner acknowledges the amending of claims 1, 15, 23, and the cancellation of claims 7, 16-22 and 29-30.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1 and 23 have been considered but are moot in view of the new ground(s) of rejection.

Please see the updated rejections below.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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Claims 1-6, 8-11, 14-15, 23-25, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rowe (US 5260953) in view of Matsumoto et al. (US 6295305).

With respect to claims 1, 6, and 11, Rowe teaches an apparatus comprising: a tunable laser cavity (title, fig.1), wherein said laser cavity comprises at least three mirrors (fig.1 #22/24/26), at least one filter (fig.1 #3) and a plurality of crystals (fig.1 #14/20), wherein said at least three mirrors are substantially arranged in a Lambda configuration (according to applicant's specification: 3 or mirrors wherein at least two of the mirrors, #22/24, are arranged at approximately equal and approximately opposite angles and approximately equidistant from at least a third mirror, #26), said at least one filter comprises a birefringent filter and an etalon (col.3 lines 53-54, col.4 line 47, col.5 lines 17-20, quartz), at least one of said plurality of crystals comprises a Chromium doped crystal (col.4 lines 60-65), and at least one of said plurality of crystals comprises a nonlinear crystal (fig.1 #16/18), wherein said at least three mirrors, said at least one filter, and said plurality of crystals are configured for providing electromagnetic radiation of an approximately single frequency (col.5 lines 13-17); at least one electromagnetic radiation source being coupled into the laser cavity (fig.1 #12), wherein said at least one electromagnetic radiation source is capable of providing electromagnetic radiation having an approximately particular wavelength (inherent) to said laser cavity, wherein at least one of said plurality of crystals is configured to, in operation, alter one or more properties of said electromagnetic radiation provided by said electromagnetic radiation source (1/2 the wavelength, col.4 lines 56-60), wherein said at least one filter is configured to filter at least a portion of the electromagnetic radiation altered by at least

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one of said plurality of crystals (col.5 lines 49-52), wherein the at least one filter is adjustable to tune the frequency of the electromagnetic radiation altered by the at least one of said plurality of crystals (col.5 lines 13-17). Rowe teaches the laser crystal to be Cr based, but not to be of the Coloquiriite type. Matsumoto teaches a harmonic generating laser system comprising a multi-mirror cavity, birefringent filter, etalon, nonlinear crystal, and a Coloquiriite laser crystal (fig.1). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser and Cr based laser crystal of Rowe with the Cr Coloquiriite laser crystal of Matsumoto in order to select a different output wavelength for the system by adjusting the lasing material.

With respect to claims 2 and 9, Rowe and Matsumoto teach the laser outlined in the rejection to claim 1, but Rowe does not teach the pumping source to be a 670nm emitting laser diode. Matsumoto teaches the use of a 670nm emitting laser diode as the pumping source for the Coloquiriite laser crystal (col.6 lines 8-11). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the Coloquiriite laser crystal system of Rowe and Matsumoto with the diode laser and pumping wavelength of Matsumoto in order to take advantage of the pumping frequency band to which the gain of the lasant crystal would be maximized.

With respect to claims 3 and 8, Rowe and Matsumoto teach the laser outlined in the rejection to claim 1, and Rowe further teaches the nonlinear crystal to be of the LBO type (col.5 lines 8-9). The lasing range of the Coloquiriite laser crystal of Rowe and Matsumoto (taught to be 780-1000nm, Matsumoto col.1 lines 27-28) combined with the

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present LBO crystal type of Rowe would then output light in the blue frequency range (~390-500nm, Matsumoto col.1 lines 28-32).

With respect to claims 4-5, Rowe and Matsumoto further teach the input light from the pumping source has its wavelength altered by one of the plurality of crystals (pumping light is converted to the output wavelength of the Colquiriite laser crystal).

With respect to claim 10, Rowe and Matsumoto teach the laser outlined in the rejection to claim 1, and Rowe further teaches the output mirror (fig.1 #26) to have different reflectivities at different wavelengths (col.5 lines 26-31). Rowe does not teach the mirror to be of a dielectric material type. Matsumoto teaches coated dielectric mirrors which have different reflectivities at different wavelengths (col.6 lines 23-30). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the varied reflectivity mirrors of Rowe with the dielectric coated varied reflectivity mirrors of Matsumoto as a matter of design choice to create the needed reflectivity, and also as a matter of flexibility in using coatings rather than a permanent mirrored surface.

With respect to claim 14, Rowe and Matsumoto teach the laser outlined in the rejection to claim 1, and Rowe further teaches the radiation passing through the filter to be altered by approximately fractions of a nanometer (col.5 lines 13-17, specific tuning on a per wavelength basis would necessitate accuracy of approximately fractions of a nanometer).

With respect to claim 15, Rowe and Matsumoto teach the laser outlined in the rejection to claim 1, and Rowe further teaches the apparatus is incorporated within a

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holographic data recording system, said holographic recording system comprising one or more photosensitive recording mediums (fig.1 #40), said laser source being configured to in operation: provide one or more laser beams to said photosensitive recording mediums (fig.1 #38 to #40), and form an image in said recording medium (image would inherently form in the CCD device).

Claim 23 is rejected for the same reasons outlined in the rejection to claim 1 above.

Claim 24 is rejected for the same reasons outlined in the rejection to claim 8 above.

Claim 25 is rejected for the same reasons outlined in the rejection to claim 3 above.

Claim 28 is rejected for the same reasons outlined in the rejection to claim 15 above.

### ***Allowable Subject Matter***

Claims 12-13 and 26-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

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Claims 12 and 26 are believed to be allowable as a tunable laser system outlined in the rejections to claims 11 and 24 above wherein 3 plates of quartz birefringent material is used to form the filter is not believed to be obvious in view of the prior art. The tunable system including all elements outlined in these claims, as well as the ability of the filter to be adjusted via orientation and tune the wavelength (Rowe, col.5 lines 17-20) are known, the addition to this system of the disclosed adjustable quartz birefringent filter to comprise at least 3 plates was found to be a non-obvious combination in view of the prior art.

Claims 13 and 27 are allowable as they depend from allowable claims 12 and 26.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of



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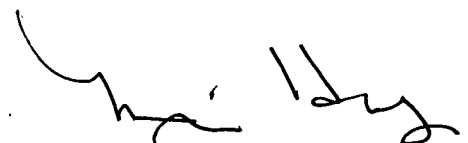
the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVR



**MINSUN CH HARVEY  
PRIMARY EXAMINER**